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(54) Abstract Title

**Sending short messages to groups of users**

(57) A group list server 15 is interfaced with a short message centre 13 in a mobile communications network in order to allow a subscriber to send a single SMS message to be copied to a group of recipients. The subscriber is provided with the ability to control membership of the recipient remotely by means of SMS messages in the form of service control messages. The service control messages may contain any of a number of various predetermined commands, which are parsed by the group list server 15 to create and edit group lists held in a database in the short message centre 13.

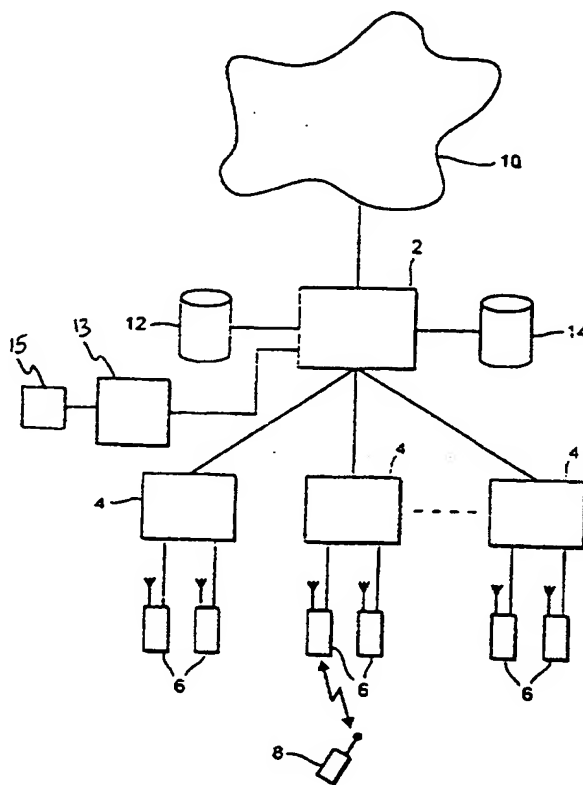


FIG. 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

**GB 2 327 571 A**

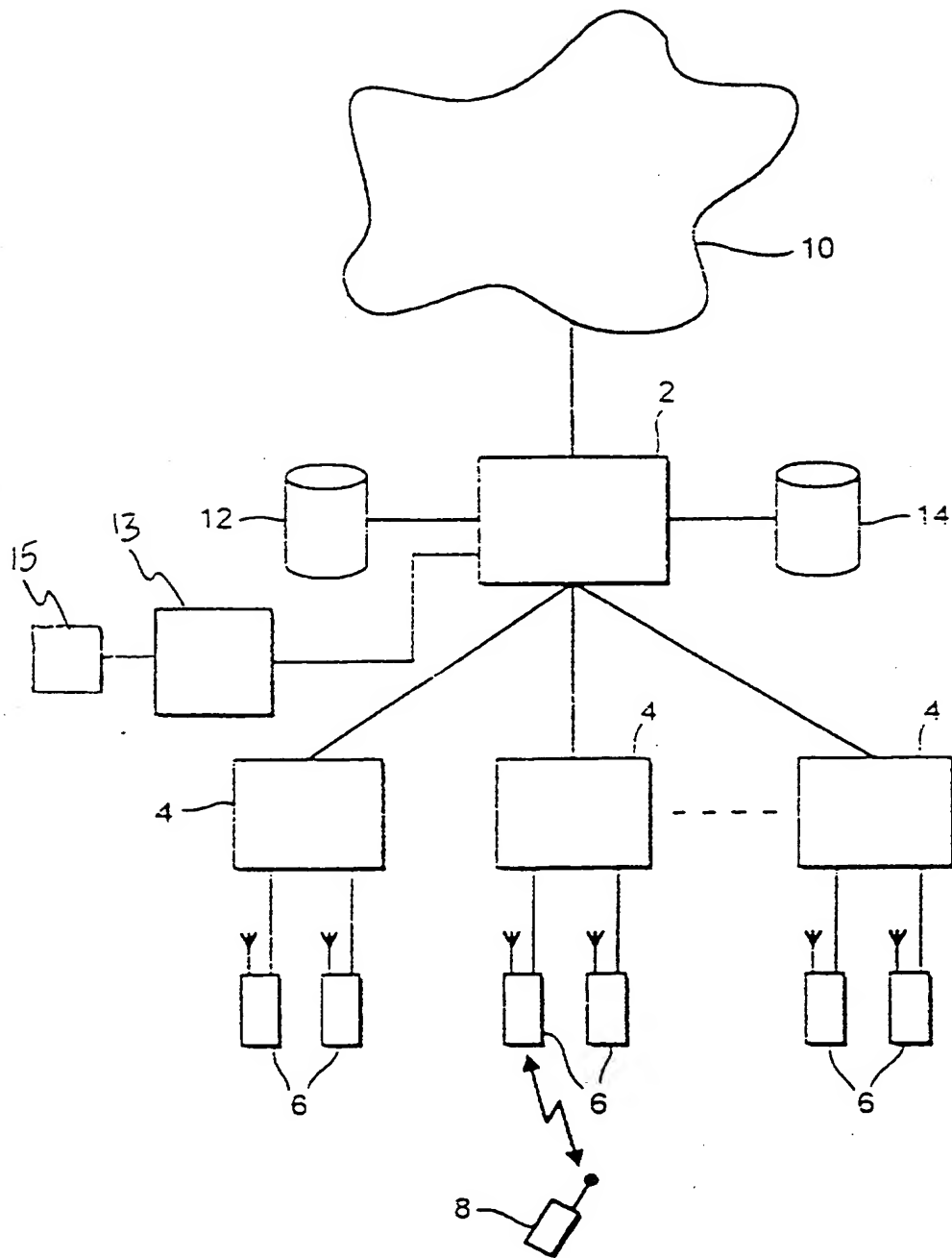


FIG. 1

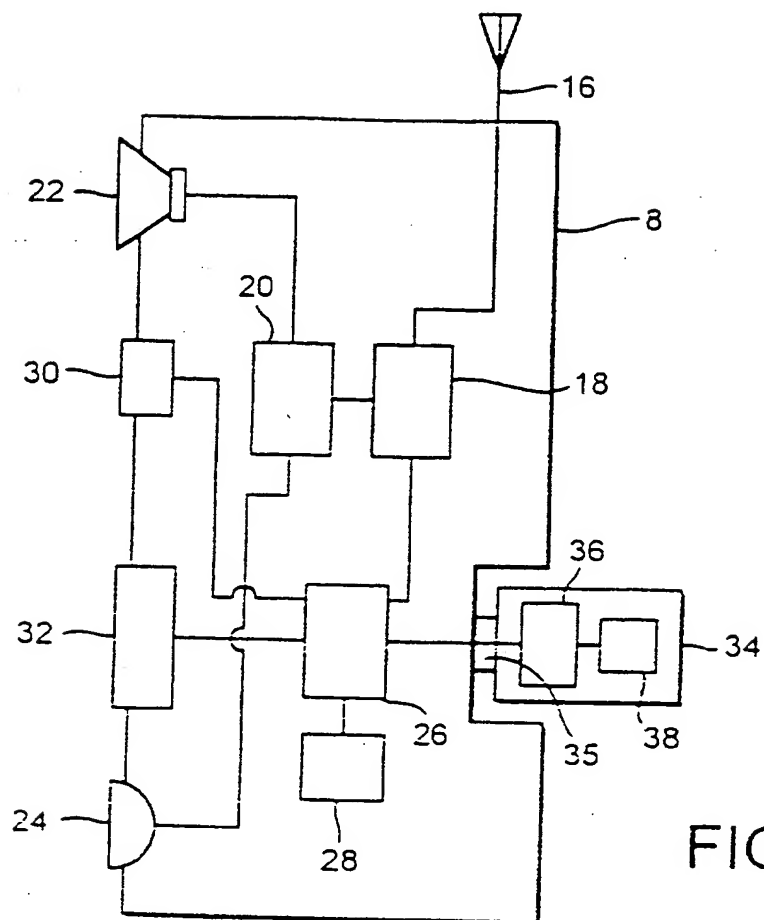


FIG. 2

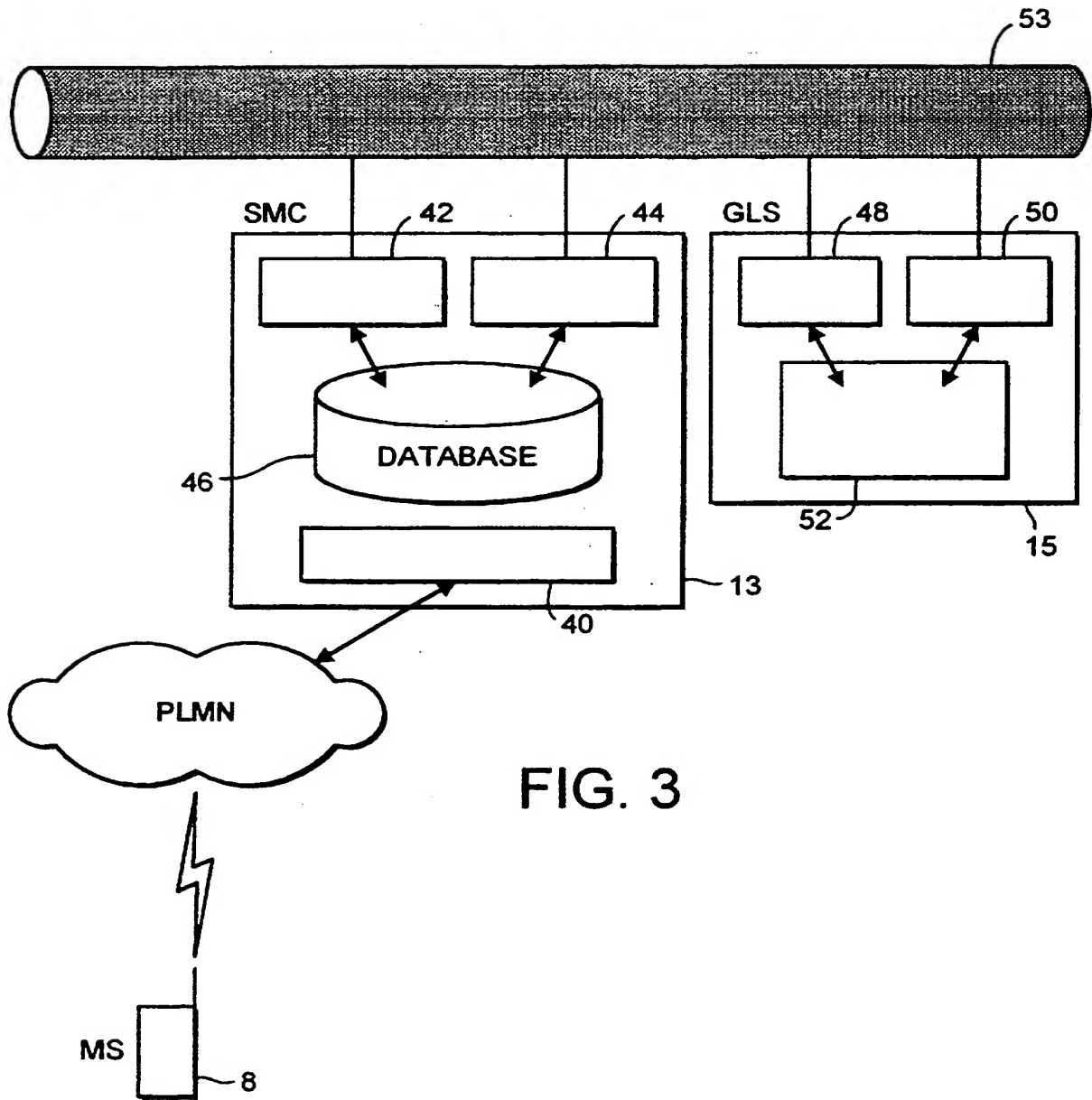


FIG. 3

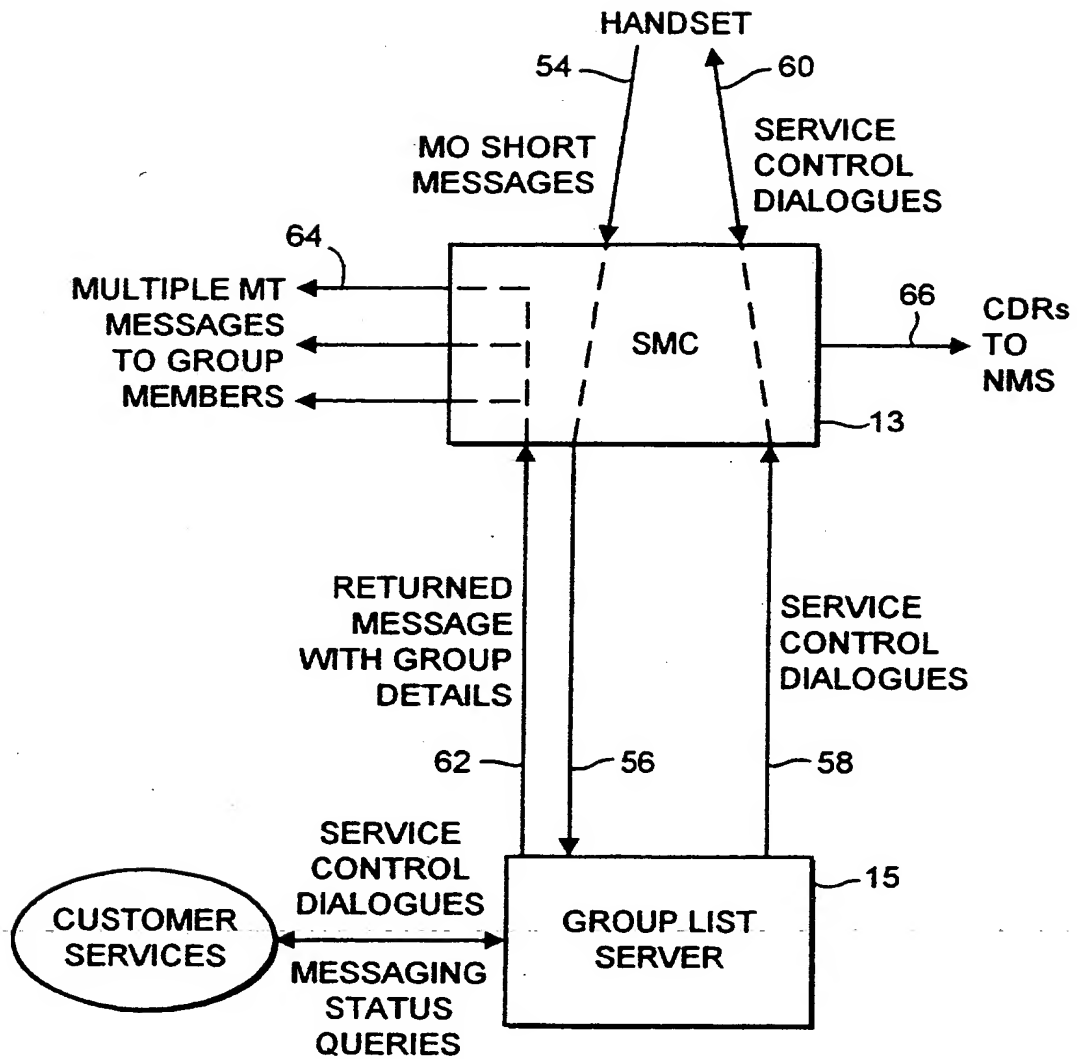


FIG. 4

MOBILE COMMUNICATIONS

This invention relates to mobile communications, in particular but not exclusively to cellular mobile radio communications, such as in a GSM (Global System for Mobile communications) digital cellular radio network.

5 One of the services defined in the technical specifications of the GSM system is a short message service (SMS). This service allows a user of a mobile station to compose a short text message (in the GSM system, of up to 160 characters in length), and to send it to a recipient mobile station via the GSM network. The network includes a short message centre (SMC) which  
10 handles the receipt of mobile originating SMS messages from SMS message originators and the forwarding of mobile terminating SMS messages to the intended recipients.

The short message service differs primarily from other types of data services, and indeed voice services, in that no end-to-end circuit connection  
15 is established between the message originator and the message recipient during transmission of the message. The term "SMS" as used herein is intended to encompass similar services provided in non-GSM mobile communications networks. For example, Motorola (Registered Trademark) has recently announced the implementation of SMS functionality in a CDMA mobile  
20 communications network. The term "SMS" is also intended to apply to messaging services provided in two-way radio paging systems, which operate

in an essentially similar fashion.

One advantage of the short message service is that a text message may be received discretely by a recipient and stored in the mobile station of the recipient until such time as the user wishes to read the message. A number of such SMS messages may be stored by the mobile station before any are read. Furthermore, on the originating mobile station side, there is no need for the originator to obtain a through connection to the recipient in order to send an SMS message - the originator is able to simply transmit the SMS message to the SMC in the network, which stores and forwards the message when appropriate.

International patent publication no. WO94/09599 describes a method for transmitting short messages in a GSM mobile communications network, whereby an SMS message received from an originating subscriber, via the SMC, is copied in an SMS gateway to be forwarded to a group of intended recipients. The SMS gateway analyses the part of the SMS message containing the address of the recipient to determine whether it contains the address of a single subscriber or a predefined identifier for a group of recipients. This identifier, if present, is used to access a list of directory numbers, which is used to determine the intended recipients of the message. However, this publication does not address the origination of the lists of recipients.

In accordance with the present invention there is provided a method of

transmitting a message to a group of recipients in a mobile communications system, said method comprising:

receiving one or more control message in the form of SMS message(s);

5 editing a list of a group of recipients in accordance with the contents of said control message(s);

receiving one or more group message to be transmitted to recipients in said group; and

copying said message(s) to recipients in said group. .

Thus, a subscriber may create or edit a group list by direct entry of an  
10 SMS message into a mobile station. For example, a subscriber may create a group list by constructing an appropriate SMS message and transmitting the message to the network, and then send a group SMS message to the SMC, which proceeds to copy the group SMS message to all recipients on the list which the subscriber has created previously. The subscriber may then proceed  
15 to edit the group list by adding further intended recipients, or deleting intended recipients from the list.

The subscriber may also define an alphanumeric name for each group list which he creates, and transmit the group name to the network. This group name may then be retrieved by the user at a later date in order to aid  
20 recognition of the group list which he has created.

The invention may also be utilised in relation to the maintenance of group distribution lists for other types of messages, such as voice messages,

fax messages or E-mail messages.

Further features and advantages of the invention will become clear from the following description, which describes an embodiment of the invention, by way of example only, with reference to the accompanying drawings, wherein:

Figure 1 is a schematic block diagram of a mobile communications network;

Figure 2 is a schematic block diagram of a mobile station;

Figure 3 is a schematic block diagram illustrating the interworking of an SMC and the GLS in accordance with the present invention; and

Figure 4 is a further schematic block diagram illustrating further interworking functionality between an SMC and GLS.

A GSM network, referred to as a public land mobile network (PLMN), is schematically illustrated in Figure 1. This is in itself known and will not be described in detail. A mobile switching centre (MSC) 2 is connected via communication links to a number of base station controller (BSCs) 4. The BSCs 4 are dispersed geographically across areas served by the mobile switching centre 2. Each BSC 4 controls one or more base transceiver stations (BTSs) 6 located remote from, and connected by further communication links to, the BSC. Each BTS 6 transmits radio signals to, and receives radio signals from, mobile stations 8 which are in an area served by that BTS. That area is referred to as a "cell". A GSM network is provided

with a large number of such cells, which are ideally contiguous to provide continuous coverage over the whole network territory.

5 A mobile switching centre 2 is also connected via communications links to other mobile switching centres in the remainder of the mobile communications network 10, and to other networks such as a public service  
10 telephone network (PSTN), which is not illustrated. The mobile switching centre 2 is provided with a home location register (HLR) 12 which is a database storing subscriber authentication data including the international mobile subscriber identity (IMSI) which is unique to each mobile station 8.  
15 The IMSI is also stored in the mobile station in a subscriber identity module (SIM) along with other subscriber-specific information.

The mobile switching centre is provided with a visitor location register (VLR) 14 which is a database temporarily storing subscriber authentication data for mobile stations 8 active in its area.

15 In addition, a short message centre (SMC) 13 is connected to the MSC 2 for implementing the short message service (SMS), as specified in GSM Technical Specification 03.40. A user of a mobile station 8 may generate an SMS message by input to a Man Machine Interface (MMI) (e.g. a keypad) of the mobile station 8, and transmit the message, along with a directory number  
20 of the terminating station for the short message, to the servicing BTS 6. The message is forwarded to the MSC 2, which forwards the message on to the SMC 13. The SMC 13 generally holds the message and handles the onward

transmission to the terminating station corresponding to the directory number specified in the SMS message by the user of the mobile station 8.

In accordance with this invention the SMC 13 interworks with a group list server (GLS) 15, to be described in detail below.

5 Referring to Figure 2, a mobile station 8 comprises a transmit/receive aerial 16, a radio frequency transceiver 18, a speech coder/decoder 20 connected to a loudspeaker 22 and a microphone 24, a processor circuit 26 and its associated memory 28, an LCD display 30 and a manual input port (keypad) 32. The mobile station is connected to a removable SIM 34 via  
10 electrical contacts 35.

The SIM 34 connected to the mobile station has a SIM processor 36, for example a Hitachi H8 microprocessor, and SIM memory 38, which includes for example 16 kilobytes of mask-programmed ROM 38a containing the SIM operating system, 8 kilobytes of read/write EEPROM 38b for the  
15 non-volatile storage of data items and 256 bytes of RAM for use by the SIM processor 36 during operations.

Figure 3 illustrates features of the SMC 13 and the GLS 15 in greater detail. The SMC includes a short message protocol application 40, an interworking protocol application 42, a provisioning protocol application 44  
20 and a group list database 46. The GLS 15 includes an interworking protocol application 48, a provisioning protocol application 50 and a short message processor 52.

The interworking protocol applications 42, 48 allow the SMC 13 and the GLS to interface via a data link such as an Ethernet LAN 53 using an application layer protocol, such as the Short Message Peer-to-Peer (SMPP) protocol as provided by ALDISCON of Dublin, Ireland.

5           The provisioning protocol applications 44, 50 allow the GLS 15 to provision, via the data link 53, group lists and group list changes in the group list database 46 of the SMC 13. The provisioning protocol used may be one of the Telepath Provisioning Customer (TPPROCUS) or SMPP provisioning (SMPPP) protocol as provided by ALDISCON, or another suitable protocol.

10           The short message protocol application 40 allows the SMC to receive SMS messages transmitted by mobile stations 8, and to transmit SMS messages to mobile station 8, via the PLMN network.

          In addition to allowing subscribers to send and receive SMS messages in the conventional manner, the arrangement of the present invention allows  
15           a subscriber to send a single SMS message which is received by a group of subscribers which the originating subscriber has previously defined. This avoids the need to send an SMS message to each terminating subscriber individually. Subscribers having the capability to send single SMS messages to be distributed to groups of subscribers (referred to herein as "group SMS  
20           messages") using the service will be referred to herein as group list subscribers.

          The group list database 46 holds up to a predetermined number of (for

example 10) group lists for each group list subscriber.

Figure 4 illustrates the functionality provided for the processing of group SMS messages in accordance with the present invention. Each subscriber is provided with a set of group list codes (for example, 50, 51, 52 ... 59) for use in identifying each group list in the network.

In order to originate a group SMS message, a group list subscriber constructs the message as a conventional SMS message, but rather than addressing the message to the MSISDN of a terminating mobile station, the group list subscriber addresses the message to a code including an initial group service code (for example, 123) followed by the group list code (for example, 51). This is transferred, via the radio interference, and the PLMN, to the SMC 13.

On receipt of this (or any) SMS message which is addressed initially with the group service code, the SMC 13 passes the group SMS message directly to the GLS 15.

On receipt of a group SMS message, the GLS 15 checks that the group list code is an acceptable group list code, and conducts a dialogue with the SMC database 46 to ensure that a corresponding group list exists in the SMC database 46. If no corresponding group list exists for the originating subscriber, the GLS generates an error message which is transmitted to the SMC for onward transmission to the originating subscriber as an SMS message, indicating that the group list specified in the address of the group

SMS message currently does not exist.

If however the corresponding group list exists, the GLS 15 returns the message to the SMC 13, with the MSISDN (in a standardised format) of the originating subscriber and the group list code specified by the subscriber, as shown at 62.

On receipt of the returned group SMS message, the SMC 13 accesses the group list database 46 to retrieve the list of recipient MSISDN numbers held for the originating subscriber and copies the group SMS message to each of the intended recipients, as shown at 62.

When the message is delivered to a recipient, the SMC 13 generates a call detail record (CDR) and transmits the CDR to a network mediation system (NMS) for billing purposes, as shown at 66. One CDR is generated for each mobile terminating message generated in the SMC as a result of the group SMS message sent by the originating subscriber.

Group list subscribers are also able to control and manage the content of their group lists by utilising various administration, management and control commands which are predefined and are to be included in an SMS message generated in and sent by the mobile station 8 under control of the subscriber using the MMI of the mobile station. These will be referred to herein as "service control messages", and do not include a message for onward transmission to an intended mobile recipient.

In order to originate a service control message, the group list

subscriber constructs an SMS message via the MMI of the mobile station 8 which includes one of a number of predefined control commands, and addresses the service control message to the group service code (for example, 123).

5           Again, when the SMC receives a service control message, 54, it recognises the group service code to which the message is addressed, and passes the group service control message directly to the group list server 15, step 56. The GLS 15 parses the service control message to extract the command contained in the service control message, and to execute a command  
10           by means of a service control dialogue, 58, between the GLS 15 and the SMC 13. This service control dialogue generally results in a response or error message being sent to the mobile station 8 as a mobile terminating SMS message by the SMC 13.

          Whenever a service control message has been identified with any of a  
15           number of different error types, e.g. Number(s) not recognised, Duplicated number(s), etc, the GLS 15 generates a corresponding error message combining all the errors that were identified in the service control message and returns an error SMS message, in the form of an SMS message sent via the SMC 13, back to the mobile station 8.

20           To create a new group list the format of the service control message shall be as follows (in this and the following, optional elements are indicated in square brackets):

*CT<group list code> [<group name>]*

*<MSISDN 1> [, <MSISDN 2> ...]*

The first two mandatory digits of the message following the create (CT) command are the 'group list code'. A list of MSISDNs then follows.

5           In the service control message, [<group name>] is an optional text name (selected by the group list subscriber) associated with the group list, and is limited to 20 characters.

As an example, to create a group list held in location 51 the following message text would be sent:

10           *CT 51 sales 0973994834 +44973992750 0966123456*

An error message response is sent to indicate an excessive group name length or number of input MSISDNs.

If the group name exceeds 20 characters the corresponding response SMS message to the mobile station is of the format:

15           *Group <group list code>: Maximum length of group name is 20 characters. Group name saved as: <group name>.*

If the number of MSISDNs in the service control message is too great, the excess MSISDNs are discarded and the response to the handset may be:

20           *Group<group list code> [<group name>]: Maximum number of members exceeds 25. <MSISDN 26> [, <MSISDN 27> ...] not added.*

A separate error message is returned to the subscriber to indicate MSISDNs or Local Integrated Numbers (LINs) that are not recognised in the

SMS database 46 (i.e. invalid MSISDNs) of the SMSC 13. Such phone numbers are omitted from the group list by the GLS parser.

5 A delivery confirmation code may be present in the service control message. The SMC 13 recognises this and acknowledge successful delivery of the short message to the GLS 15 with an SMS message sent back to the originating mobile station 8. The GLS 15 discards this code when parsing the message.

10 If a desired group list create service control message exceeds the 160 characters available in a single GSM SMS message then a first message can be sent and an additional one or two messages then sent to the group service code address (e.g. 123). As specified in GSM Technical Specification 03.40, the final character in the first message and the first character of the second message must be a '+' sign. This pattern is repeated by the subscriber when constructing the service control messages if a third message is required. On receipt of a service control message having a final character a '+' sign, the GLS awaiting receipt of a further message from the same originator, address, and concatenates the two.

20 If the originator of the service control command does not send the second message of a concatenated pair within a predefined period (for example, 30 minutes) the GLS 15 times out and interprets the first service control message that it received as a command to create and configure the group.

An example of the concatenated message format is shown as follows:

First concatenated service control message:

*CT 51 0973994834 +44973992750 0966123456*

*<MSISDN 4> ..to.. <MSISDN 9> +*

- 5           The corresponding response SMS message that is sent back to the mobile station 8 after each concatenated message that is sent to the GLS 15 is as follows:

*Remember, you must send the next part of the message within 30 minutes.*

- 10           Second concatenated service control message:

*++44973994534, +44973992850, 0976123656, <MSISDN 13>, ..to.. <MSISDN 17> +*

The corresponding response message to indicate that another message is expected by the GLS parser is then sent in return.

- 15           Third concatenated service control message:

*+0973994534, +44973996750, 0976173456, <MSISDN 21>, ..to.. <MSISDN 25>*

- 20           Once the GLS 15 has determined that a full service control command has been received to create a new group list, the GLS 15 sends a provisioning message to the SMC 13, which configures the new group with the details specified in the service control message(s) received.

A response is returned to the mobile station 8 when the group list has

been successfully configured on the SMSC 13. The response message may have the following format:

*Group <group list code>[<group name>]: Set up with <n> member(s).*

- 5           where <group name> only appears if a group name field entry exists, and  $n$  = the total number of MSISDNs in the group list and does not exceed a predetermined number, for example 25.

If however the subscriber attempts to create a group that already exists then a separate error message is returned to indicate that the group already exists. The following error message is then returned to the mobile station 8.

*Group <group list code>: Already exists.*

Group lists may also be modified by adding a number of MSISDNs (up to a maximum of 25 members (i.e. 25 MSISDNs)) to an existing group and/or by adding group name if none previously exists. To add a MSISDNs to an existing group list the following format of service control message is used:

*ADD <group list code>[<group name>] <MSISDN> [, <MSISDN> ...]*

The response SMS message sent to the mobile station 8 once the SMC database 46 is provisioned with the added list members is:

20           *Group <group list code> [<group name>]: Set up with <n> members*

If the number of MSISDNs that are attempted to be added cause the

total number of MSISDNs in the group list to exceed the predefined limit, the excess MSISDNs are discarded by the GLS and the response sent to the mobile station 8 is:

5           *Group* <group list code> [*<group name>*]: *Maximum number of members exceeds 25. <MSISDN 26> [, <MSISDN 27> ...] not added.*

If no group name field exists against the original group list definition, the input <group name> is provisioned to the SMC database 46 and entered into the group name field.

10           When the GLS 15 determines from the SMC database 46 that one or more number(s) attempted to be added to a group list already exists within the group list then the GLS 15 rejects the number(s) and return the following message format to the handset:

*Member(s) already in group <group list code>: <MSISDN 1> [, <MSISDN 2> ...].*

15           In instances when one or more number(s) are duplicated within a single service control message when attempting to add a number to a group list, the GLS rejects the number(s) and return the following message format to the handset:

20           *Group <group list code>: Duplicated number(s): <MSISDN 1> [, <MSISDN 2> ...].*

If the user tries to add a group name to a group list that already has an associated group name, the new group name field entry is discarded and an

error SMS message is returned to the mobile station 8 to indicate that a group name already exists. The following error message is returned to the handset:

*Group name <existing group name>: Already exists for group <group list code>.*

5           A global command, which allows explicit deletion of one or more group(s) has the format:

*DT <group list code>*

To delete all group lists held for the subscriber in the SMC database 46, the text of the service control message has the following format:

10           *DT ALL*

The response SMS message sent to the mobile station 8 on receipt of a valid delete message has the following format:

*Deleted group(s): <group list code 1> [, <group list code 2>., <group list code n>].*

15           For example:

*Deleted group(s): 50, 51, 52, 56.*

In instances when one or more group(s) are duplicated within a single service control message when attempting to delete one or more group(s), the GLS 15 rejects the group ID(s) specified and returns the following message

20           format to the mobile station 8:

*Duplicated group(s): <group list code 1> [, <group list code 2> ...].*

A delete member command allows explicit deletion of one or more

members within a group list. The format for a service control message containing this command is as follows:

*DT <group list code> <MSISDN> [<MSISDN>...]*

5 The corresponding response sent by the GLS 15 to the mobile station 8, once the SMC database 46 has been appropriately provisioned, indicating the command has been executed is as follows:

*Group <group list code>: <n> member(s) deleted.*

10 The following error message is returned to the group list subscriber to indicate incorrectly entered MSISDNs that are not members of the edited group list:

*Group <group list code>: Number(s) not recognised: <MSISDN 1> [, <MSISDN 2> ...].*

where <MSISDN> is an unrecognised number.

15 In instances when one or more number(s) are duplicated within a single service control message when attempting to delete a member from a group list, the GLS 15 shall reject the number(s) and return the following message format to the handset:

*Group <group list code>: Duplicated number(s): <MSISDN 1> [, <MSISDN 2> ...]*

20 The group list subscriber may transmit a service control message containing a 'wildcard' query of the settings of the subscriber's group lists using a list command. This shall be achieved by submitting an SMS message

to the group service code with the following text:

The format of the status response message will be:

*Group(s): <group list code> [<group name>], [<group list code>] [<group name>, ...].*

5           The group lists returned will be a list of those group lists that have been defined. For example, the GLS 15 may respond with a status message as follows:

*Group(s): 50 sales, 51 engineering, 56 finance.*

10           In circumstances where the list command is invoked where no groups have been defined then the GLS 15 returns the following response message:

*No group(s) have been created.*

The setting of each group list can be checked. The following syntax may be used by the subscriber in a service control message:

*TL <group list code>*

15           A response SMS message indicating the contents of the group list is returned to the mobile station 8 as follows:

*Group <group list code> [<group name>]: <MSISDN 1>, <MSISDN 2> ...]*

20           Alternatively, an error SMS message to indicate that a group list is not configured when a list command is invoked is sent in the following format:

*Group <group list code>: Not created.*

If the list command is invoked on a group list that has no members

defined (i.e. an empty group list) then the following format response message shall be returned to the handset:

*Group <group list code> [<group name>]: No member(s).*

5 If a group list has been defined with a relatively large number of members within the group and the list service control command is invoked by the user the returned information is returned to the mobile station 8 as a number of concatenated SMS messages.

The following response message is returned when a service control message containing the HELP command is sent by the group list subscriber:

10 *CT: Create Text messaging group.*

*ADD: Add member(s).*

*DT: Delete member(s) or group(s).*

*TL: List member(s) or group(s).*

15 In addition, the group list subscriber is able to request help on any individual command as follows:

*HELP [CT] [ADD] [DT] [TL] [HELP]*

The GLS 15 returns an appropriate response SMS message containing an explanation of how the commands are used.

20 The following error response message is returned when the syntax of the help command is incorrect:

*Invalid help command entered. To use the help command type: HELP HELP.*

Finally, in situations where the user has entered any command or command string that is not syntactically correct or a function is being used in an incorrect manner the following 'wildcard' response SMS message is returned to the mobile station 8:

5           *Command not recognised. For help, please send HELP to 123.*

During the service control dialogues, the SMC 13 generates appropriate CDRs.

It is to be noted that the group SMS message identification mode, the service control message syntax and the response and error SMS message structures exemplified above are not intended to be limiting in any way, since  
10           alternative formulations could equally be used to similar effect.

By use of the present invention, a group list server is interfaced with a short message centre in a mobile communications network in order to allow a subscriber to send a single SMS message to be copied to a group of recipients. The subscriber is provided with the ability to control membership  
15           of the recipient remotely by means of SMS messages in the form of service control messages. The service control messages may contain any of a number of various predetermined commands, which are parsed by the group list server to create and edit group lists held in a database in the short message centre.

20           It is envisaged that the present invention may also be utilised in relation to the management of group distribution lists for other services, such as voicemail, fax, e-mail, etc. In that case, the group list database could be

held in the network in the teleservice node in question, and the GLS would interface with that teleservice node, on receipt of a group service control SMS message via the SMC, in order to create, edit and access the group lists held for the service in question.

- 5           It is also envisaged that various other modifications and variations could be employed in relation to the embodiment described without departing from the scope of the present invention.

CLAIMS:

1. A method of transmitting a message to a group of recipients in a mobile communications system, said method comprising:  
receiving one or more control message in the form of SMS message(s);  
5 editing a list of a group of recipients in accordance with the contents of said control message(s);  
receiving one or more group message to be transmitted to recipients in said group; and  
copying said message(s) to recipients in said group.
- 10 2. A method according to claim 1, wherein both said control message(s) and said group message(s) are received from a single subscriber.
3. A method according to claim 1 or 2, comprising parsing a control message to identify a command therein.
4. A method according to any preceding claim, further comprising  
15 transmitting an SMS message to the originator of said control message to confirm the creation or editing of said group list.
5. A method according to any preceding claim, comprising

transmitting an SMS message to the originator of said control message to inform of an error in a control message.

5           6.     A method according to any preceding claim, wherein said control message(s) comprise one or more of a group list creation command, a group list recipient addition command, a group list deletion command, a group list recipient deletion command, a service help command, and a group list listing command.

10           7.     A method according to any preceding claim, further comprising storing a group list code and/or name specified by the originator of said control message, for identification of said group list.

8.     A method according to any preceding claim, wherein said control message comprises a portion which identifies said group list from a plurality of group lists.

15           9.     A method according to any preceding claim, wherein said group message has an originating address which identifies said group list from a plurality of group lists.

10.     A method according to any preceding claim, comprising storing

a plurality of group lists for a subscriber in said mobile communications system.

11. A method according to any preceding claim, wherein a group list is identified by the terminating address of said group message.

5           12. A method according to any preceding claim, further comprising noting a concatenation indication in a control message, and attempting to concatenate the contents of said control message with those of another control message.

10           13. A method according to claim 12, further comprising awaiting receipt of said another message for a predetermined period of time.

14. A method according to claim 12 or 13, further comprising transmitting notification to the originator of a control message when said concatenation indication is contained therein.

15           15. Apparatus adopted to perform the method of any preceding claim.

16. Apparatus according to claim 15, comprising a group list

management means which interfaces with a group list storage means on receipt of a control message.

17. Apparatus according to claim 16, wherein said group list management means interfaces with said group list storage means when a group message is received.

5

18. A method, or apparatus, according to any preceding claim, wherein said one or more group messages comprise one or more of an SMS message, a fax message, an e-mail message and a voice message.



Application No: GB 9715244.1  
Claims searched: 1 to 18

Examiner: Jared Stokes  
Date of search: 15 September 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:	
UK CI (Ed.O):	H4L (LDG,LDM, LDLX, LDSX) G4H (NEL)
Int CI (Ed.6):	H04Q (7/10, 7/22, 7/28)
Other:	On-Line - WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	WO 94/09599 A1 (Nokia) See abstract	-
A	WO 92/08309 A1 (Dibianca) See abstract	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
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